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GROWTH AND EXTERNAL DEBT: A NEW PERSPECTIVE ON THE AFRICAN AND LATIN AMERICAN TRAGEDIES

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ABSTRACT

Growth and External Debt: A New Perspective on the African and Latin American Tragedies*

This paper addresses two puzzles of the growth literature: the failure of standard growth equations to account for slow growth in Latin America and Africa; and the surprising failure of trade to explain growth when trade liberalization appears to play a significant role. The paper shows that: i) African growth is readily explained by macroeconomic mismanagement and low investment; ii) trade liberalization should be taken as a *proxy* for good 'macroeconomic' management rather than a genuine measure of the effect of trade upon growth; and iii) poor growth in Latin America (which does not seem to be explained by the preceding feature) is explained well by a variable (constructed in the text) representing the likelihood of debt crisis.

JEL Classification: F34
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NON-TECHNICAL SUMMARY

Growth specialists have long had difficulty in identifying the causes of poor growth in Africa and Latin America. According to early estimates these continents are both growing – *ceteris paribus* – at a reduced rate of 1.3–1.5% per year. Recent endeavours to analyse the origin of this problem had some success in explaining the African tragedy: the 'ethnic' diversity of the African nations explaining why they could not agree on an efficient set of institutions that might foster growth; and the degree of trade liberalization explaining why African economies failed to capitalize on world wealth to catch up with other nations.

The problem with these interpretations is that they leave intact the Latin American tragedy. Accounting for ethnicity or trade liberalization always leaves Latin America's growth rate 1.5% behind the performance of other countries. There is also another difficulty with trade liberalization: when controlling directly for the degree of openness itself, conventionally measured as trade over GDP, the ratio appears to play no role in explaining growth (when account is taken of investment). One answer to this puzzle may be that openness is actually a poor indicator of the ability of a given country to import the goods it needs. Typically, a large country will always appear to be less open than a small one. The surprising feature reported here is that when openness is corrected for size, the corresponding measure appears to be (significantly) negatively correlated with growth! Splitting the sample in to those who have liberalized trade and those who haven't, trade seems to hurt the latter, but not the former. Trade liberalization appears to be a means of dampening the harmful effects of trade on protected countries, rather than a means of raising growth in open economies. The question to answer then becomes, through which channel is it that trade hurts the protected economies, rather than through which channel is it that trade fosters growth opportunities?

The answer that this paper offers is twofold. First, exchange rate mismanagement is one key channel through which trade hurts protected economies. When the exchange rate is overvalued, the more open the economy, the worse its growth performance. The second dimension relates to debt crisis. Latin American economies have long been subject to the risk of debt crisis. Closed economies do not risk much by threatening to default, but, along with exchange rate mismanagement, external debt mismanagement does hurt countries open to trade.

These factors help to explain the two underlying mysteries that were outlined above: the Latin American and the trade puzzle. When the risk of debt crisis and exchange rate mismanagement (weighted by trade) are taken into account, the two puzzles are solved.

By accounting for the role of the debt crisis influence, one can also construct new solvency indicators. The World Bank has set two external debt benchmarks: a debt-to-export ratio above 220%; and a debt-to-GDP ratio above 80%. Both ratios have the merit of successfully tracking most of the debt crisis episodes. In retrospect, they appear to fit many characteristics of countries in debt trouble (discount on secondary market price, years of the first rescheduling...). The paper attempts to enrich our understanding of these debt indicators by investigating their ability to explain the growth performance of developing countries. By exploiting this correlation between growth and external debt, I construct three debt thresholds above which the risk of debt crisis appears to have the largest negative effect on growth. Beyond the debt-to-export and the debt-to-GDP ratios, I show that a debt-to-tax ratio also performs extremely well in predicting the risk of a debt crisis. The corresponding critical values above which this risk appears to have the largest negative effects on growth are: debt-to-export above 200%; debt-to-GDP above 50%; and debt-to-tax above 300%. For the first two indicators these results are more conservative than the figures from the World Debt Tables. The third threshold is still tentative, but appears to be a very promising indicator.

1 Introduction

Growth specialists have long had difficulties pinning down the causes of two mysteries, two "tragedies" in the words of Easterly and Levine (1997) the African and the Latin American's poor growth. According to early estimates such as those performed by Barro (1991), each of these continents is growing -ceteris-paribus- at a lower yearly rate of about 1.3 to 1.5%. Recent endeavors to analyze the origin of these discrepancy had some success in explaining African tragedy. Easterly and Levine make use of the "Ethnic" diversity of Africa as an argument for understanding why the nations of this continent could not agree upon an efficient set of institutions fostering growth. Sachs and Warner (1995) construct a variable measuring the degree of "trade liberalization" explaining the reasons why African economies failed to build upon the wealth of the world for catching up the other nations.

As I will review in this paper, the problem with these interpretations is that they leave intact the Latin American tragedy. Accounting for ethnic dimensions or trade liberalization always leave Latin America's growth rate 1.5% behind the performance of other countries. Another difficulty arise when dealing with "trade liberalization" When controlling directly for the degree of openness itself, conventionally measured by trade over GDP, one finds that such ratio appears to play no role in explaining growth (when account is taken of investment). One answer to this puzzle may be that openness is a poor indicator of what it is supposed to measure namely the ability of a given country to import the goods that it needs. Typically a large country will always appear to be less open than a small one. The surprising feature that we shall document in the paper is the following: when openness is corrected by size, the corresponding measure appears to be *negatively* correlated with growth! Splitting the sample in two (those which liberalized trade and the other), we find that trade *hurts* the countries which did not liberalize, but does nothing to those which did. "Trade liberalization" appears to be a means to dampen the harmful effects of trade upon protected countries, rather than a means to raise growth in the open economies. The question then becomes: through which channel is it that trade hurts the protected economies, rather than: through which channel is it that trade foster growth opportunity?

The answer that I will offer is two fold. For one thing, exchange rate mismanagement is one key avenue through which trade hurts protected economies. When the exchange rate is overvalued, the more open the economy, the worse

is its growth performance. The second dimension has to do with the debt crisis. Being subject to the risk of a debt crisis has been a long time feature of Latin American economies. Surely, a closed economy should not risk much by threatening to default. But, along with exchange rate mismanagement, external debt mismanagement do hurt countries which are open to trade.

Such is the avenue that, we shall argue, helps explains the two underlying mysteries that we outlined: the Latin American and the trade puzzle. When the risk of a debt crisis, the exchange rate mismanagement (weighted by trade) are taken into account, these two puzzles are settled. It is by accounting for the role of the Debt crisis influence, that I will construct new solvency indicators in the note that follows.

2 Growth and mismanagement

We take as a starting point the analysis that has been performed by Easterly and Levine (EL) for understanding what they call the "African Tragedy" First consider a framework "à la Barro" in which growth is written as a function of the Log of initial income, LRGDP, squared of Log of initial income, LRGDPSQ, schooling (LSCHOOL measured by *Log* (1+number of years of schooling of the population)), population growth (measured by LPOP= *Log* $(0.05 + n)$, as in Mankiw Romer and Weil (1993), where n is population growth) and two continental dummies for Africa and Latin America and the Caribbean. One gets the results that are displayed in Eq.1.1 (table 1), in which we focus on the 70s and the 80s (similar results are obtained when including the 60s). All variables are highly significant (except LPOP which is only significant at the 10% confidence level). In particular, one sees that both continental dummies are significant and that their point estimate is large. According to Eq. 1.1, Africa experiences a 1.3% growth discrepancy to the other countries, while Latin America and the Caribbean experience an even larger shortfall of 1.6%.

One variables which is missing from the EL framework is the investment ratio, while it is critical to the analysis in Mankiw, Romer and Weil (henceforth MRW), which reinterprets growth equation as a linearized version of the Solow model. When account is taken of the *Log* of investment (variable $LINV$), the African dummy is marginally reduced to 1.1% (and remains significant) while the Latin American dummy is increased to 1.9%.

By taking account of terms of trade fluctuation (TOT), one manages to reduce further the African dummy to a point estimate of 0.9%, and to have its significance fall below the 5% degree of confidence. These results are maintained when instrumenting investment (by openness, relative price of investment and

income) (see eq1.5 in which LINV2 is the instrumented value) which shows that the endogeneity of investment does not seem to be a problem here.

Variables	EQ.1.1	EQ.1.2	EQ.1.3	EQ.1.4	EQ.1.5
C	0.080	-0.28	-0.34	-0.43	-0.38
	(2.26)	(-2.43)	(-2.80)	(-3.39)	(-2.94)
DUM80	-0.015	-0.015	-0.013	-0.017	-0.013
	(-4.71)	(-4.65)	(-4.08)	(-5.26)	(-3.97)
AFRICA	-0.012	-0.011	$-0.87.10^{-2}$	-0.013	$-0.87.10^{-2}$
	(-2.59)	(-2.24)	(-1.68)	(-2.62)	(-1.51)
LATINCA	-0.015	-0.019	-0.019	-0.023	-0.021
	(-3.85)	(-4.72)	(-4.62)	(-5.55)	(-4.97)
LRGDP	$-0.40.10^{-2}$	0.083	$0.093.10^{-2}$	0.10	0.11
	(-1.25)	(3.09)	(3.37)	(3.78)	(3.72)
LRGDPSQ		$-0.57.10^{-2}$	$-0.64.10^{-2}$	$-0.74.10^{-2}$	$-0.75.10^{-2}$
		(-3.26)	(-3.57)	(-3.89)	(-4.02)
LSCHOOL	$-0.33.10^{-4}$	$0.29.10^{-2}$	$0.56.10^{-2}$	0.015	0.010
	(-0.062)	(0.58)	(1.03)	(2.81)	(1.85)
LPOP	$-0.62.10^{-2}$	-0.019	-0.023	-0.016	-0.019
	(-0.44)	(-1.33)	(-1.59)	(-1.01)	(-1.28)
LINV	0.017	0.017	0.016		
	(5.05)	(4.93)	(4.51)		
LINV2					0.016
					(2.54)
TOT			0.10	0.12	0.11
			(2.48)	(2.81)	(2.60)
Adj.R^2	*0.39*	*0.48*	*0.44*	*0.37*	*0.40*

TABLE 1 determinants of growth
(t statistic in parenthesis)

A number of other variables are added to the regression, that encompass various channels through which the economy might be either distorted or perturbed. These variables are:

.the financial deepness of the economy, LLY (total domestic debt to GDP)

.the black market discount, BLCK

.the government surplus, SURP.

As one can read from table 2, these three variables add power to the regression, either when investment is not introduced (Eq. 2.1) or introduced (Eq. 2.2) or instrumented (Eq. 2.3). When investment is introduced in the regression or

instrumented, the African dummy falls to -0.5%, and loses significance even to the 10% confidence level. In all instances, however, the Latin American dummy is unchanged to about -1.4%, and remains highly significant.

Variables	EQ.2.1 (t-statistic)	EQ.2.2 (t-statistic)	EQ.2.3 (t-statistic)	EQ.2.4 (t-statistic)	EQ.2.5 (t-statistic)	EQ.2.6 (t-statistic)
C	-0.35	-0.32	-0.3	-0.22	-0.24	-0.18
	(-2.48)	(-2.43)	(-2.13)	(-1.57)	(-1.77)	(-1.23)
DUM80	-0.014	-0.010	-0.012	-0.014	-0.010	-0.012
	(-4.14)	(-3.17)	(-3.42)	(-4.07)	(-3.21)	(-3.45)
AFRICA	-0.011	$-0.53.10^{-2}$	$-0.52.10^{-2}$	$-0.9.10^{-2}$	$-0.21.10^{-2}$	$-0.3.10^{-2}$
	(-2.10)	(0.97)	(-0.84)	(-1.59)	(-0.34)	(-0.46)
LATINCA	-0.016	-0.013	-0.014	-0.019	-0.015	-0.017
	(-3.52)	(-3.03)	(-3.13)	(-4.23)	(-3.41)	(-3.84)
LRGDP	0.098	0.093	0.098	0.076	0.080	0.075
	(3.06)	(3.10)	(3.06)	(2.37)	(2.63)	(2.33)
LRGDPSQ	$-0.69.10^{-2}$	$-0.67.10^{-2}$	$-0.72.10^{-2}$	$-0.58.10^{-2}$	$-0.60.10^{-2}$	$-0.59.10^{-2}$
	(-3.34)	(-3.44)	(-3.47)	(-2.77)	(-3.04)	(-2.85)
LSCHOOL	$0.96.10^{-2}$	$0.81.10^{-2}$	$0.90.10^{-2}$	0.011	$0.35.10^{-2}$	0.011
	(1.68)	(1.42)	(1.50)	(2.02)	(6.16)	(1.96)
LPOP	-0.011	-0.025	-0.010	$-0.37.10^{-2}$	-0.017	$-0.28.10^{-2}$
	(-0.71)	(-1.62)	(-0.67)	(-0.23)	(-1.11)	(-0.17)
LINV		0.016			0.015	
		(4.40)			(3.79)	
LINV2			0.016			0.013
			(2.18)			(2.02)
TOT	0.063	0.045	0.058	0.056	0.043	0.051
	(1.43)	(1.12)	(1.34)	(1.31)	(1.06)	(1.22)
LLY	0.024	0.016	0.016	0.020	0.014	0.012
	(3.31)	(2.29)	(2.08)	(2.83)	(2.05)	(1.64)
SURP	0.14	0.14	0.11	0.13	0.13	0.10
	(3.88)	(4.20)	(3.11)	(3.77)	(3.88)	(2.88)
BLCK	-0.018	-0.015	-0.020	-0.019	-0.016	-0.021
	(-3.30)	(-2.93)	(-3.55)	(-3.56)	(-3.26)	(-3.74)
ETHNIC				-0.021	-0.017	-0.023
				(-2.77)	(-2.31)	(-2.96)
Adj. R^2	*0.49*	*0.56*	*0.51*	*0.53*	*0.58*	*0.54*

TABLE 2 (t statistic in parenthesis)

In order to account for the "African Tragedy" Easterly and Levine have introduced a new variable "ETHNIC" that measures the ethnic diversity of any given country. The idea behind this variable is that ethnically diverse countries find it more difficult to agree upon an efficient government and the means to foster growth. Adding the ETHNIC variable to the other regressors raises further the quality of the fit and lowers the value of the African dummy. Even when investment is not taken into account, the African dummy falls to 1% and is only significant at the 10% degree of confidence. When investment is taken into account (or instrumented) the African dummy becomes negligible at -0.2% and loses all significance.

At this stage, one then sees that the "African tragedy" can be explained by taking account of the low African investment rate, its mismanagement of the economy and its ethnic diversity (which proxies other channels through which the economy might be distorted). More work is needed for understanding Africa's low investment, but we certainly gained something in understanding that such is one of the critical variable through which low growth is explained.

As already pointed out in Fischer (1993), domestic macroeconomic mismanagement stands as the other key variable that explains the poor performance of African countries. In none of these exercises, however, do we explain the "Latin American Tragedy" When all the variables suggested by EL are taken into account, as well as the investment ratio, the Latin American Dummy remains at -1.5%.

3 Growth and openness

Sachs and Warner have suggested another avenue through which growth might be affected: the degree of trade liberalization of a country. They construct a new variable, which we call OPEN, which takes 1 if the country has "liberalized" trade in 1970 and zero otherwise. Table 3 reports the results that are obtained when this variable is introduced on top of the key MRW variables. As one sees from Eq.3.2, it is highly significant. It does some good to the Latin American Dummy which falls to -1.2%, although the variable remains highly significant. When all previous variables drawn from the "African tragedy" paper are included, see Eq.3.3, the African dummy falls to zero, but the Latin American dummy gets back to the 1.5% value that it reached in table 2. Meanwhile however, Schooling becomes insignificant and wrongly signed. When insignificant variables are dropped out, see Eq.3.4, the African dummy is worth -0.8% and the Latin American dummy is at -1.5% so that, at the end, not much is gained with respect to the previous section.

and Italy, that did succeed to reach primary surpluses aimed at stabilizing their debt-to-GDP ratios. At the climax of their efforts, Belgium reached a primary surplus amounting to 10% of its tax base; Italy 12% and Ireland 15%. If one takes Ireland data as "the" upper bound, and if one applies again the value $r-n=5\%$, one then gets an upper bound for the debt-to-tax ratio of 300%. Although the number appears to be near the 290% benchmark that we reached previously, they are not meant to capture the same ceilings. In the case that was discussed in the growth context, the ceiling was meant to capture the external debt-to-GDP ratio, while in the revealed argument that we sketch now, the ceiling captures *total* government debt (both domestic and foreign). If one trusts the order of magnitude that we reached, this might be an indication of the fact that foreign debt is implicitly favored over domestic debt (the latter being junior the former).

More work is needed in this topic, but at this stage, one might keep a debt-to-tax ceiling of 300% as one potential benchmark.

does not appropriately measure what it is intended to capture, namely the ability of a country to freely import those goods which it does not efficiently supply domestically. Typically a large country will always appear to be less open than a small country, simply because it is able to supply domestically more of the goods that it needs.

In order to take account of such problem, we have regressed the degree of openness upon the inverse of the square root of population (the idea being that traders are on the borders of a circle of size πR^2 and of periphery $2\pi R$). The variable is highly significant (t statistic = 10.6). We then extract from openness the correction brought by size, and take this new variable, called DOPN, as a proxy for the degree of "true" openness of a country. The result is shown in table 4, Eq.4.1. We find that our new variable DOPN is wrongly signed: being more open, ceteris paribus, lowers growth! How do we reconcile this finding with the role of the Sachs-Warner variable?

In order to shed light on this issue, let us interact these two variables DOPN and OPEN by constructing:

$$\begin{aligned} DOPSW0 &= DOPN * (1 - OPEN) \\ DOPSW1 &= DOPN * OPEN \end{aligned}$$

The result is shown in Eq.4.2. It turns out that the significant variable that remains is DOPSW0, *with a negative sign*. In words: *it is those countries which have not liberalized their trade which suffer from trade openness.* The Sachs-Warner variable therefore appears to capture the harmful effects of distortion upon trade rather than the benefits of trade openness *per se*.

Variables	EQ.4.1 (t-statistic)	EQ.4.2 (t-statistic)	EQ.4.3 (t-statistic)
C	-0.16	-0.17	-0.15
	(-1.27)	(-1.35)	(-1.19)
DUMS0	-0.012	-0.011	-0.012
	(-4.04)	(-3.65)	(-3.79)
AFRICA	$0.13.10^{-2}$	$0.43.10^{-2}$	$0.38.10^{-2}$
	(0.21)	(0.74)	(0.66)
LATINCA	-0.016	-0.017	-0.015
	(-3.57)	(-4.04)	(-3.58)
LRGDP	0.068	0.074	0.070
	(2.4)	(2.66)	(2.49)
LRGDPSQ	$-0.49.10^{-2}$	$-0.53.10^{-2}$	$-0.50.10^{-2}$
	(-2.61)	(-2.92)	(-2.74)
LSCHOOL	$0.66.10^{-2}$	$0.88.10^{-2}$	$0.77.10^{-2}$
	(1.21)	(1.68)	(1.42)
LPOP	$0.82.10^{-2}$	$0.86.10^{-2}$	0.013
	(0.52)	(0.57)	(0.81)
LINV	0.014	0.018	0.016
	(3.50)	(4.73)	(4.15)
TOT	0.099	0.12	0.11
	(2.51)	(3.13)	(2.87)
ETHNIC	-0.02	-0.019	-0.018
	(-2.92)	(-2.62)	(-2.64)
OPEN	0.017		$0.73.10^{-2}$
	(3.93)		(1.33)
DOPN	-0.012		
	(-1.60)		
DOPSWO		-0.062	-0.051
		(-4.70)	(-3.39)
DOPSW1		$0.12.10^{-2}$	$-0.23.10^{-2}$
		(0.16)	(-0.28)
Adj. R^2	*0.55*	*0.57*	*0.57*

TABLE 4 (t statistic in parenthesis)

These results are confirmed in Eq. 4.3, in which we dropped out the insignificant variables. Neither OPEN nor DOPSW1 remains significant. But when the negative effect of trade is taken into account, the African dummy becomes positive(!) while Latin America remains at -1.5%.

4 The rescheduling variable

As a preliminary step towards explaining the effect of the debt crisis upon growth, we shall review in this section the indicators of the debt crisis. We started from the rescheduling data that have been produced by the World Debt Tables publication of the World Bank, and which exists for the 70s and the 80s.

We constructed a variable RES which is zero if the country never rescheduled and 1 if the country did reschedule (for each of the two sub-periods 1970s and 1980s). From such variable, and as a manner of instrumenting it, we estimated a probit model in which the RES variable is regressed upon the beginning of period Debt-to-GDP Ratio (DEBT), the liquidity of the Economy (LLY) the Latin American dummy and the Sachs-Warner variable OPEN. (Interestingly the African Dummy is not significant). We took one model for the seventies, and one for the eighties. We call PRES the probability of a rescheduling, which has been computed through a probit model based upon the rescheduling which took place during the seventies and the eighties.

The results come as follows:

In the seventies

$$PRES = c + \underset{(1.0)}{0.37}\ Latin\ America + \underset{(3.3)}{0.034}\ DEBT - \underset{(-1.44)}{0.85}\ OPEN - \underset{(-0.54)}{1.43}\ LLY$$

Percentage of correct predictions: 0.81; (t statistic in parenthesis).

In the eighties

$$PRES = c + \underset{(3.20)}{1.83}\ Latin\ America + \underset{(3.2)}{0.04}\ DEBT - \underset{(-2.54)}{2.06}\ OPEN - \underset{(-3.0)}{4.22}\ LLY$$

Percentage of correct predictions: 0.90; (t statistic in parenthesis).

One sees, as should be expected, that the debt variable is highly significant and -interestingly- that the point estimate of the coefficient is not significantly changed in the eighties compared to the seventies.

On the other hand, the other explanatory variables are only highly significant in the eighties. The Latin American Dummy is very significant in the eighties, pointing to a regional factor that is well documented in the debt literature. Interestingly, the Sachs-Warner variable is also highly significant: those countries

which have liberalized trade are also less likely to reschedule their debt (in the eighties! It is not totally obvious to understand the channels for which this correlation stands, and to some extent, it takes us back to the ambiguous status of this variable. It can either be taken as an indicator of "good management" in general, or as an implicit measure of the signalling effects of trade liberalization upon the credit rating of a country.

5 Back to the growth equation

Beyond the risk of a debt crisis, there is another avenue through which openness may hurt a country: the mismanagement of the exchange rate. The more distorted is the exchange rate and the more likely it is that import competition will hurt domestic producers. We shall then define an additional variables, OPB, the product of openness with black market premium. When interacted with the degree of openness, we find that the black market premium OPB is highly significant and dominate the standard black market premium. Furthermore, when splitting the sample of countries in two, those for which the Sachs-Warner variable is zero from those for which it is one, one finds that it is only in the subgroup of countries which did not open to trade that the variable appears to play a role.

Putting all such variables together, we then get results that are displayed in table 5. Both variables OPB (Black market × openness) and PRES (probability of rescheduling) are highly significant variable. Conditioning upon these variables, the Sachs-Warner variable OPEN loses significance at the 5% degree of confidence (but it appears through its effect on Rescheduling), and ETHNIC survives. When all these variables are taken into account, neither the Africa dummy (which is now *positive* and significant at the 10% degree of confidence!) nor do the Latin American dummy (which is exactly nil) remain a problem. Interestingly, one also sees that the LLY variable becomes insignificant, which is an indication that its role in explaining growth also originates from its interaction with the debt crisis. The results are robust to instrumenting investment (Eq.5.4). The role of the debt crisis on growth comes on top of the role of debt on investment that I described in Cohen (1993).

As a test of the robustness of our variable PRES, we have proceeded to two exercises. First, we have split the sample of countries in two: those which did reschedule their debt and those which did not. We then tested in which of these two samples our PRES variable was significant. If PRES was a proxy for "something else" such as mismanagement "in general", we should expect it to be significant in both sub-samples. If PRES was collinear to the rescheduling variable itself, so that a problem of reverse causality would really arise, we should expect

it to be non-significant in the sample which did not reschedule. If instead, we believe that PRES is really a proxy for the risk of debt crisis, then it should only be significant in the sample of countries which did *not* reschedule, because they are those for which the risk of a forthcoming crisis is still there. On the other hand, it should not be significant for the sub-group of countries which did reschedule and for which it has no more predictive power (the role of the debt crisis being encompassed in the constant). And this is indeed what we observe: the PRES variable only comes out significant (with a t of 2.5) in the sub-sample which did not reschedule.

As another test of the robustness of the PRES variable, we have discretized its value by constructing a variable DPRES50 that is worth 1 if the country experience a probability larger than 50% to reschedule its debt, and zero otherwise. The result is shown in Eq.5.5, in which one sees that the Latin American dummy remains negligible (while the OPEN variable regains significance). Interestingly, one also sees that the introduction of the risk of a rescheduling into the equations also make the Time Dummy 1980 insignificant, which is then an indication of the role of the debt crisis in explaining the poor performance of the 1980s.

Variables	EQ.5.1 (t-statistic)	EQ.5.2 (t-statistic)	EQ.5.3 (t-statistic)	EQ.5.4 (t-statistic)	EQ.5.5 (t-Statistic)
C	-0.24 (-1.84)	-0.24 (-1.87)	-0.19 (-1.40)	-0.15 (-1.04)	-0.21 (-1.7)
DUM80	$-0.14.10^{-2}$ (-0.36)	$-0.17.10^{-2}$ (-0.44)	$-0.25.10^{-2}$ (-0.64)	$-0.29.10^{-2}$ (-0.72)	$-0.36.10^{-2}$ (-1.06)
AFRICA	$0.85.10^{-2}$ (1.44)	$0.85.10^{-2}$ (1.45)	$0.73.10^{-2}$ (1.23)	$0.48.10^{-2}$ (0.77)	$0.01.10^{-2}$ (1.6)
LATINCA	$0.11.10^{-3}$ (0.022)	$0.20.10^{-4}$ (0.040)	$0.13.10^{-4}$ ($0.26.10^{-2}$)	$-0.48.10^{-2}$ (-0.93)	$0.76.10^{-2}$ (0.17)
LRGDP	0.082 (2.80)	0.083 (2.85)	0.073 (2.47)	0.073 (2.34)	0.074 (2.74)
LRGDPSQ	$-0.62.10^{-2}$ (-3.25)	$-0.63.10^{-2}$ (-3.32)	$-0.56.10^{-2}$ (-2.87)	$-0.59.10^{-2}$ (-2.93)	$-0.56.10^{-2}$ (-3.11)
LSCHOOL	$0.16.10^{-2}$ (0.27)	$0.19.10^{-2}$ (0.33)	$0.29.10^{-4}$ ($0.47.10^{-2}$)	$0.64.10^{-2}$ (1.05)	$-0.13.10^{-2}$ (-0.25)
LPOP	-0.020 (-1.33)	-0.020 (-1.32)	-0.012 (-0.72)	$-0.69.10^{-2}$ (-0.42)	$-0.11.10^{-2}$ (-0.72)
LINV	0.019 (5.04)	0.019 (5.15)	0.018 (4.56)		0.018 (4.85)
TOT	0.045 (1.21)	0.046 (1.23)	0.037 (0.97)	0.051 (1.28)	0.026 (0.74)
LLY	$0.2.10^{-2}$ (-0.23)		-0.035 (-0.41)		
SURP	0.052 (1.37)	0.055 (1.48)	0.043 (1.13)	0.069 (1.75)	0.030 (0.94)
ETHNIC	-0.013 (-1.89)	-0.013 (-1.89)	-0.014 (-2.00)	-0.018 (-2.47)	$-0.98.10^{-2}$ (-1.50)
OPB	-0.047 (-2.72)	-0.047 (-2.79)	-0.046 (-2.70)	-0.041 (-2.29)	-0.061 (-4.64)
PRES	-0.032 (-4.44)	-0.031 (-4.62)	-0.030 (-4.01)	-0.031 (-4.29)	
DPRES50					-0.02 (-4.97)
OPEN			$0.65.10^{-2}$ (1.38)		$0.89.10^{-2}$ (2.21)
LINV2				0.021 (3.40)	
Adj.R^2	*0.64*	*0.64*	*0.64*	*0.58*	*0.70*

TABLE 5

Clearly, one needs to rely on further explanations to understand why is it that Latin America appears to be so highly vulnerable to a debt crisis. Other work exists (such as Ozler, 1993) that points to the role of History, and many other upon the way by which a financial crisis is spread out to neighboring countries. But to repeat what we said on Africa's low investment: to the extent that we can rule out reverse causality (by taking beginning of period variable for explaining PRES, and through the in-sample test of its predictive power among the countries that did not reschedule), we believe to have gained insights in identifying the channel through which the poor Latin American growth has to be explained.

6 Conclusion

The literature on growth had, for a long time, some trouble understanding the reasons why Africa and Latin America were performing so poorly. Building upon two recent contributions by Easterly and Levine and Sachs and Warner, our paper has attempted to shed some additional light on these issues.

Regarding Africa, first, we have shown that low investment, policy distortions and terms of trade fluctuations turned out to be the key factors behind the slow growth of the continent. Both the Easterly-Levine and the Sachs-Warner variable add significance to the equations but do not change much the point estimate of the African dummy. None of these variables, however, appear to be able to resolve the Latin American Tragedy. Furthermore the Sachs-Warner variable appears to contradict a surprising result according to which trade itself appears to be negatively correlated to growth.

We progressed in analyzing these questions by introducing two additional variables: black market premium interacted with degree of openness and probability of a debt crisis. When this is done, the negative effect of trade upon growth loses significance and so does the Latin American dummy. Based upon the role of debt on growth, I suggested another way of thinking of critical debt ratios as those above which the adverse effect of debt on growth were the most significant.

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A NOTE ON SOLVENCY INDICATORS

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1 Introduction

Indicators of solvency are badly needed to address ahead of time the risk of financial crises. Regarding external debt, the World Bank has set two benchmarks: debt-to-export ratios above 220%, and debt-to-GDP ratios above 80%. Both ratios have the merit of successfully tracking most of the debt crisis episodes. In retrospect, they appear to fit many characteristics of countries in debt trouble (discount on secondary market price, years of the first rescheduling...). The approach that I want to present in this note is to enrich our understanding of these debt indicators by investigating their ability to explain the growth performance of developing countries. As is shown in the previous note, the risk of a debt appears to be a powerful determinant of the growth performance of developing countries that allows, among other things, to understand the stubborn failure of African and Latin American economies to perform according to standard growth equations. By exploiting this correlation between growth and external debt, I will construct three debt thresholds above which the risk of a debt crisis appear to have the largest negative effects on growth. Beyond the debt-to-export and the debt-to-GDP ratios, I will show that a debt-to-tax ratio also performs extremely well in predicting the risk of a debt crisis. The corresponding critical values above which this risk appear to have the largest negative effects on growth are: debt-to-export above 200%; debt-to-GDP above 50%; debt-to-tax above 300%. These results are more conservative than the World Debt Tables numbers, so far as the first two indicators are concerned. The third threshold is still tentative, but appear to be a very promising indicator.

2 The rescheduling variable

2.1 Risk of a debt crisis

In our companion note, we constructed a variable RES which is zero if the country never rescheduled and 1 if the country did reschedule (for each of the two subperiods 1970s and 1980s). From such variable, and we estimated a probit model

in which the RES variable is regressed upon the beginning of period Debt-to-GDP Ratio (DEBT), the liquidity of the Economy (LLY) the Latin American dummy and the Sachs-Warner variable OPEN (which takes a value of one if the country liberalized its trade before 1970). (Interestingly the African Dummy is not significant). Let us focus here on the eighties.

The results come as follows:

$$\begin{aligned} PRES &= c + \underset{(3.20)}{1.83}\ Latin\ America + \underset{(3.2)}{0.04}\ DEBT \\ &\quad - \underset{(-2.54)}{2.06}\ OPEN - \underset{(-3.0)}{4.22}\ LLY \end{aligned}$$

Percentage of correct predictions: 0.90

One sees, as should be expected, that the debt variable is highly significant The Latin American Dummy is very significant, pointing to a regional factor that is well documented in the debt literature. Interestingly, the Sachs-Warner variable is also highly significant: those countries which have liberalized trade are also less likely to reschedule their debt (in the eighties). It is not totally obvious to understand the channels for which this correlation stands, and to some extent, it takes us back to the ambiguous status of this variable. It can either be taken as an indicator of "good management" in general, or as an implicit measure of the signalling effects of trade liberalization upon the credit rating of a country.

2.2 Other specifications

Let us investigate here other specifications that might be relevant for predicting the debt crisis. One can think of at least two other indicators: Debt/Export and Debt/Tax Ratio. The first indicator is most often used for analyzing the solvency of a country to the extent that it takes as a denominator the "hard" currency earnings of a country. The second indicator is less often used, and relates to the fact that most LDC debt is government debt which has to be serviced out of government revenue. We shall focus here again upon the eighties.

i) Debt-to-Export Ratios

One gets the following regression:

$$\begin{aligned} PRES &= \underset{(1.89)}{-1.87 + 0.53 Log\ (D/X)} \\ &\quad \underset{(-0.68)}{-0.93 LLY} - \underset{(-1.94)}{1.07 OPEN} \\ &\quad \underset{(2.67)}{+ 1.28 Latin\ America} \end{aligned}$$

Percent correct predictions: 0.80.

The quality of the fit turns out to be of a lower quality than the one which is obtained by taking debt-to-GDP as an explanatory variable. This may be surprising in view of the fact that debt-to-export are more often taken as prediction of a debt crisis than debt-to-GDP. This may be due to the fact that they are better "summary statistics" than debt-to-GDP, when taken unconditionally. As one way to address this question, we performed a univariate regression in which either debt-to-GDP or debt-to export values are considered alone. One then gets the following results.

When considering debt-to GDP only:

$$PRES = \underset{(3.53)}{-1.91 + 0.71 LogD/Q} \quad ; \text{ percentage of correct prediction} = 0.65$$

When considering debt-to-export only:

$$PRES = \underset{(4.06)}{-3.26 + 0.79 LogD/X} \quad , \text{ percentage of correct prediction} = 0.66.$$

When both regressors one put together, one then gets:

$$PRES \quad \underset{(1.01)}{-3.32 + 0.27 LogD/Q} + \underset{(2.45)}{0.63 Log(D/X)}$$

Percentage of correct prediction = 0.67.

We then get indeed that the best "unconditional predictor" (i.e. univariate regressor) of a debt crisis is indeed given by the debt-to-export ratio. When instead, one allows for other determinant of a debt crisis such as those that we considered in the previous section, the conclusion is reversed. Merging all such determinants, one indeed gets:

$$\begin{aligned} PRES \quad = \quad & \underset{(3.13)}{-0.97 + 1.80 LogD/Q} - \underset{(-1.09)}{0.46 LogD/X} \\ & \underset{(-2.73)}{-8.28 LLY} - \underset{(-2.91)}{2.40 OPEN} \\ & \underset{(2.57)}{+1.47 Latin\ America} \end{aligned}$$

Percentage of correct predictions = 0.90.

One now sees that the debt-to-GDP is the best (conditional) predictor of a debt crisis. The degree of openness, conventionally measured, does reduce the probability of a debt crisis, but the influence is only significant at the 10% degree of confidence.

ii) Debt-to-tax ratio

When the debt-to-tax ratio is taken into account, one gets the following result:

$$\begin{aligned} PRES &= \underset{(3.15)}{0.31 + 1.52}\ LogD/T \\ &\quad \underset{(-1.02)}{-2.80} LLY - \underset{(-2.42)}{1.85} OPEN \\ &\quad + \underset{(2.92)}{1.73} Latin\ America \end{aligned}$$

Percent correct prediction = 0.91.

The results which are obtained are excellent although -interestingly- the liquidity ratio loses significance. This may be taken as an indication of the fact that taxing capabilities and liquidity of the economy operate as substitutes.

When D/T and D/Q are put together, along with the other determinants, D/Q appears to dominate D/T. But when D/T and D/Q are put together, absent the other conditioning variables, it then turns out that D/T dominates the fit. We are then led to the same results as those obtained with debt-to-export ratios: debt-to-GDP is a better conditional predictor, but a worse unconditional predictor than debt-to-tax.

We are then led to a single comparison: which of debt-to-tax or debt-to-export is a better unconditional predictor of debt crisis. The result turns out to favor debt-to-tax. When both variables are put together we indeed obtain:

$$PRES = -0.84 + \underset{(2.11)}{1.01} LogD/T + \underset{(0.61)}{0.25} LogD/X$$

Percentage correct prediction = 0.74.

To summarize the results obtained in this section, we therefore see that the debt-to-GDP ratio is the best conditional prediction of a debt crisis, when account is also taken of the liquidity of the economy, of the trade liberalization variable of Sachs and Warner and of the Latin American Dummy. When the prediction is made unconditionally upon these variables, then either the debt-to-tax ratio or the debt-to-export ratio turn out to be better predictors, with the former dominating the latter.

3 Indicators of solvency

3.1 Rescheduling thresholds

Let us now attempt to use the previous results as means to construct (new) indicators of solvency for indebted. nations. The *World Debt Tables* report a classification of indebted countries according to two criteria: debt-to-export ratios above 220% and debt-to-GDP ratios above 80%. Which light does our previous results shed upon such indicators?

The method that we suggest follows two steps. Starting from the results shown above, we shall first investigate what is the critical benchmark above which the probability of a rescheduling is best representative of a country's growth problem, such as they elucidated in our companion paper.

In order to answer such question, we have constructed a new variable P_x that takes one if a country is exposed to a probability larger than x to reschedule its debt, and zero otherwise. We then look for the critical value of x^* for which the influence of the variable P_{x^*} on growth is maximized. In other words, we discretize optimally the variable PRES, from the view point of its effect upon growth.

A grid of various values for x^* are tried, and it turns out that $x^* = 60\%$ gives the best fit. For the world as a whole, this is associated to the following benchmarks:

Debt ratios for which the probability of a rescheduling exceeds 60%:

Debt-to-GDP: 50%
Debt-to-Export: 200%
Debt-to-Tax: 290%

As one sees, these ratios are slightly more conservative than those which are traditionally used for assessing debt-to-GDP and debt-to-export ratio.

These numbers, however, are only world averages. For each country, taking account of the country's characteristics, it becomes feasible to compute an explicit probability of rescheduling based upon the probit equations that were performed, and to classify the countries according to their risk. The results are shown in appendix 3, where the countries are ranked according to their risks.

3.2 A comparison to alternative indicators

How do this method to compute solvency criteria compare to other techniques? In previous studies, I have suggested a number of methods to compute solvency indicators that I will briefly summarize here (appendix 2 offers a brief overview of the implicit analytical framework).

i) Average debt ratios at the time of the first rescheduling

This is the simplest and most naive method, yet it is certainly a telling indicator: what was in average the debt level that was reached when countries experienced their first debt crisis? The answer comes as follows: for Latin America as a whole the average value corresponds to a debt-to-export ratio worth 250% and for the world as a whole it stood at 270% in the eighties. The number is probably an upper bound to the number that we must keep in mind in order to assess the probability of such event to occur.

ii) Revealed preference argument

Another method consist in extrapolating the servicing capacity that was observed in the past, as a manner of computing the upper limit to the debt ratio.

As a theoretical benchmark, consider the following exercise. Assume that an economy inherits a stock of debt D, and assume that the economy is in a steady state. Call n the rate of growth of the economy, and r the interest rate that it has to pay. One can then readily show that the country will have to transfer a fixed fraction λ of its income in order to stabilize its debt-to-GDP ratio, and that this fraction λ is a solution to:

$$\lambda = (r - n)\frac{D_t}{Q_t}$$

If the country were willing to pay more than λ, then the debt-to-DGDP would fall and the country would be solvent; but if the country was not willing to service λ, then debt-to-GDP ratio would explode and the country would be insolvent. As I show in appendix 2, the upper band to such value λ corresponds to the implicit cost of debt repudiation, i.e. to the alternative cost that the country would have to bear if it were to default on its debt. This interpretation allows us to analyze the issue of debt sustainability in terms of the *flows* of net resources which an indebted country is willing to transfer. As a measure of what a country "could pay" (i.e. as a measure of the revealed cost of debt repudiation), one can indeed *observe* what fraction of their income was surrendered by the large debtors at the peak of the debt crisis. If one takes the "top five" debtors of Latin America (Argentina, Brazil, Chile, Mexico and Venezuela), the number is worth 4%. If one takes a value $r - n = 5\%$ (which is fairly standard in such exercises), one can reconstruct an upper bound for the debt-to-GDP ratio of about 80%. (Which

is indeed the benchmark taken by the Word Debt Table). Our exercise suggest an average of 50% which is then much more conservative. One can see however that the argument behind the 80% benchmark hinge on the assumption that the net transfers that were observed at the peak of the worst debt crisis could be repeated in case of necessity! Although our theoretical model suggest that this should indeed be the case, there is little doubt that 80% ceiling is definitely an upper limit of solvency.

iii) Secondary market price

Another method for evaluating critical ratios of solvency consist in analyzing the secondary market for LDC debt. By relying upon Bulow and Rogoff (1989)'s critical distinction between average and marginal price, one can perform economic estimates of the price of LDC debt that depends upon key economic parameters of a country, and most notably its debt-to-GDP ratio. From such estimates, one can first compute the price (and the corresponding debt ratios) for which the *marginal price* of the debt becomes zero. This corresponds to the level of indebtedness for which, *at the margin*, the country has exhausted its repayment capability so that one more dollar of debt would actually be worth nothing to the creditors as a whole. When such estimates are performed, one finds a critical price of 30 cents on the dollar as a benchmark, which corresponds to debt-to-GDP ratio of 250% and a debt-to-export ratio of 640%. Clearly, such values do not deliver a debt ceiling above which a country should be declared in trouble. Instead, they correspond to the upper bound above which debt becomes, on the margin, totally worthless. As an indicator of the ratio of debt above which a country might be gauged in trouble, I have computed the debt ratios above which the discount on the debt exceeds 25% (i.e. the debt is priced at 75 cents on the dollar). One finds a debt-to-GDP ratio of 68% and a debt-to-ex-post ratio of 220%. Again, we get in the range that corresponds to the World Debt Table benchmark, although the Debt-to-GDP ratio is now lower.

iv) Tax burden

The same revealed argument method that was used above, can be used in principle, to assess the upper bound, as a fraction of its tax base, of a debt that a government might service. (I sketch the argument in appendix 2). So, similarly to the exercise that is performed regarding the external debt, one write that the debt to be serviced has to be bound by an inequality of the kind:

$$(r - n)D/T \leq \theta$$

in which θ corresponds to revealed values of primary surpluses. Although we walk here on more uncertain waters, one can take as an upper bound to θ the value that was reached by such large debtors as the governments of Ireland, Belgium

and Italy, that did succeed to reach primary surpluses aimed at stabilizing their debt-to-GDP ratios. At the climax of their efforts, Belgium reached a primary surplus amounting to 10% of its tax base; Italy 12% and Ireland 15%. If one takes Ireland data as "the" upper bound, and if one applies again the value $r-n=5\%$, one then gets an upper bound for the debt-to-tax ratio of 300%. Although the number appears to be near the 290% benchmark that we reached previously, they are not meant to capture the same ceilings. In the case that was discussed in the growth context, the ceiling was meant to capture the external debt-to-GDP ratio, while in the revealed argument that we sketch now, the ceiling captures *total* government debt (both domestic and foreign). If one trusts the order of magnitude that we reached, this might be an indication of the fact that foreign debt is implicitly favored over domestic debt (the latter being junior the former).

More work is needed in this topic, but at this stage, one might keep a debt-to-tax ceiling of 300% as one potential benchmark.

does not appropriately measure what it is intended to capture, namely the ability of a country to freely import those goods which it does not efficiently supply domestically. Typically a large country will always appear to be less open than a small country, simply because it is able to supply domestically more of the goods that it needs.

In order to take account of such problem, we have regressed the degree of openness upon the inverse of the square root of population (the idea being that traders are on the borders of a circle of size πR^2 and of periphery $2\pi R$). The variable is highly significant (t statistic = 10.6). We then extract from openness the correction brought by size, and take this new variable, called DOPN, as a proxy for the degree of "true" openness of a country. The result is shown in table 4, Eq.4.1. We find that our new variable DOPN is wrongly signed: being more open, ceteris paribus, lowers growth! How do we reconcile this finding with the role of the Sachs-Warner variable?

In order to shed light on this issue, let us interact these two variables DOPN and OPEN by constructing:

$$\begin{aligned} DOPSW0 &= DOPN * (1 - OPEN) \\ DOPSW1 &= DOPN * OPEN \end{aligned}$$

The result is shown in Eq.4.2. It turns out that the significant variable that remains is DOPSW0, *with a negative sign*. In words: *it is those countries which have not liberalized their trade which suffer from trade openness*. The Sachs-Warner variable therefore appears to capture the harmful effects of distortion upon trade rather than the benefits of trade openness *per se*.

a) It loses access to the world financial markets

b) Its trade is impaired in a way that reduces the aggregate efficiency of the economy: after sanction we shall assume that output shrinks from Q_t to $(1-\lambda)Q_t$.

It then becomes possible to assess the constraint imposed by the bankers. Call $J_t(D^*)$ the value of programme (1) when the country inherits an outstanding external debt D and expect a stream of income $(Q_s)_{s\geq t}$ to be forthcoming.

Furthermore, call J_t^d the post default level of welfare, namely:

$$J_t^d = \sum_{s=t}^{\infty} \beta^{(s-t)} u\left[Q_s(1-\lambda)\right].$$

Lenders will then impose that the stream of debt is such that:

$$\forall t, J_t(D^*_t) \geq J_t^d.$$

In other words, they impose that the level of welfare obtained by re-imbursing the debt is always superior to that which is obtained by defaulting.

One can then prove the following:

Proposition 1 - Whenever they are constrained, debtors will never repay more than λQ_t.

The proof is given in Cohen (1991). Let us highlight the following. Proposition 1 does not claim that creditors can only redeem λQ_t every period: it claims that it only does so in times when the no-repudiation constraint *binds*. This implies that creditors might be *willing* to pay more. This might happen for instance when they are experiencing a boom and wish to reduce their external commitment so as to get ready to borrow again when the next downturn arises. If however, one assumes that the country is in a steady growth pattern (or in a situation where business cycles fluctuations are negligible compared to the outstanding debt problems that it faces), one may then concludes that λQ_t is the upper bound to the stream of repayments.

A similar argument can be developped for a government. Say that the government is interested in

$$J_g = \text{Maximize} \sum_{0}^{\infty} \beta^t v(G_t)$$

subject to its intertemporal budget constraint. Furthermore, let assume that defaulting lead the government to

- lose its access to financial markets and

- to lose its "liquidity" by which is meant that tax collection can be thought as shifting from T_t to $(1-\theta)T_t$ $(\theta \leq 1)$.

In that case, the same result as before is obtained: when the government is constrained by its non-repudiation ceiling, its will generate a surplus

$$PS_g(t) = \theta T_t$$

so that the aggregate debt of the government should be written:

$$D = B_g + B^* \leq \frac{\theta}{r-n} T$$

which might be written in percentage of GDP:

$$D/Q \leq \frac{\theta}{r-n} \frac{T}{Q}.$$

Appendix 2
Solvency indicators

1. RES: Rescheduling in the eighties: 1, yes, 0: no.
2. PRES: Probability of rescheduling (such as computed in the text)
3. PVPIB: Debt-to GDP (1985, present value calculations)
4. PVX85: Debt-to-Export (1985, present value calculations)
5. PVTAX85: Debt-to-Tax (1985, present value calculations).

Appendix 2
Solvency indicators

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5. PVTAX85: Debt-to-Tax (1985, present value calculations).

	RES3	PRES	PVX85
NICARAGUA	1	100%	1505
SUDAN	1	98%	660
BOLIVIA	1	98%	498
TANZANIA	1	97%	722
MADAGASCA	1	96%	548
ARGENTINA	1	95%	513
CHILE	1	95%	434
SIERRA LEO	1	95%	382
BRAZIL	1	91%	362
BANGLADES	0	90%	202
MALI	1	90%	317
COLOMBIA	0	89%	309
NIGER	1	89%	249
URUGUAY	1	88%	294
MAURITANIA	1	88%	283
UGANDA	1	87%	192
GHANA	1	87%	212
PHILIPPINES	1	87%	322
PERU	1	86%	305
BURUNDI	1	85%	169
ECUADOR	1	84%	257
COSTA RICA	1	84%	316
HONDURAS	1	81%	246
GUATEMALA	1	81%	208
INDONESIA	0	80%	168
COTE D'IVOI	1	80%	280
SENEGAL	1	80%	197
EGYPT	1	79%	205
CONGO	1	79%	213
PARAGUAY	1	79%	207
MOROCCO	1	77%	370
GUYANA	1	77%	451
BURKINA FA	0	77%	152
DOMINICAN	1	76%	204
JAMAICA	1	74%	274
RWANDA	0	71%	107
MALAWI	1	71%	177
NIGERIA	1	71%	141
TURKEY	0	70%	190
CENTRAL AF	1	69%	105
INDIA	0	68%	209
GAMBIA, THI	1	66%	162
TOGO	1	64%	155
KENYA	0	62%	200
EL SALVADC	1	59%	127
BENIN	1	59%	102
NEPAL	0	57%	87
HAITI	1	53%	90
CAMEROON	1	52%	92
VENEZUELA	1	51%	206
THAILAND	0	50%	163
KOREA, REP	0	48%	142
PAKISTAN	0	47%	169
SRI LANKA	0	43%	110
TUNISIA	0	42%	147
GABON	1	33%	54
SWAZILAND	0	32%	64
PANAMA	1	26%	74
FIJI	0	25%	78
MAURITIUS	0	19%	92
TRINIDAD AI	1	16%	55
BOTSWANA	0	15%	32
MALAYSIA	0	15%	109
ALGERIA	0	12%	128
PAPUA NEW	0	6%	17
BARBADOS	0	6%	56
PORTUGAL	0	2%	162
MALTA	0	5,75257D-11	21
AFGHANIST/	0		

ANGOLA	1		
AUSTRALIA	0		
AUSTRIA	0		
BAHAMAS, T	0		
BAHREIN	0		
BELGIUM	0		
CANADA	0		
CAPE VERDI	1		129
CHAD	1		94
CHINA	0		53
COMOROS	1		347
CYPRUS	0		
DENMARK	0		
DOMINICA	0		66
ETHIOPIA	0		199
FINLAND	0		
FRANCE	0		
GERMANY, F	0		
GREECE	0		
GRENADA	0		74
GUINEA	1		
GUINEA-BIS	1		1171
HONG KONG	0		
HUNGARY	1		673
ICELAND	0		
IRAN	0		41
IRAQ	0		
IRELAND	0		
ISRAEL	0		
ITALY	0		
JAPAN	0		
JORDAN	1		119
KUWAIT	0		
LESOTHO	0		35
LIBERIA	0		
LUXEMBOUF	0		
MEXICO	1		302
MOZAMBIQU	1		1217
MYANMAR	0		
NETHERLAN	0		
NEW ZEALAI	0		
NORWAY	0		
OMAN	0		42
POLAND	1		256
SAUDI ARAB	0		
SEYCHELLE:	0		72
SINGAPORE	0		
SOLOMON IS	0		53
SOMALIA	1		
SOUTH AFRI	0		
SPAIN	0		
ST, LUCIA	0		15
ST, VINCENT	0		21
SURINAME	0		
SWEDEN	0		
SWITZERLAI	0		
SYRIAN ARA	0		
TONGA	0		
UNITED ARA	0		
UNITED KINC	0		
UNITED STA	0		
VANUATU	0		10
WESTERN S.	0		80
YEMEN, REP	1		
YUGOSLAVI/	1		
ZAIRE	1		
ZAMBIA	1		
ZIMBABWE	1		145

BAHAMAS, T	0	.	
BAHREIN	0	.	
BELGIUM	0	.	
CANADA	0	.	
CAPE VERDE	1	.	37
CHAD	1	.	16
CHINA	0	.	6
COMOROS	1	.	59
CYPRUS	0	.	
DENMARK	0	.	
DOMINICA	0	.	26
ETHIOPIA	0	.	16
FINLAND	0	.	
FRANCE	0	.	
GERMANY, W	0	.	
GREECE	0	.	
GRENADA	0	.	34
GUINEA	1	.	
GUINEA-BISS	1	.	104
HONG KONG	0	.	
HUNGARY	1	.	284
ICELAND	0	.	
IRAN	0	.	3
IRAQ	0	.	0
IRELAND	0	.	
ISRAEL	0	.	
ITALY	0	.	
JAPAN	0	.	
JORDAN	1	.	44
KUWAIT	0	.	
LESOTHO	0	.	4
LIBERIA	0	.	
LUXEMBOUR	0	.	
MEXICO	1	.	47
MOZAMBIQU	1	.	68
MYANMAR	0	.	
NETHERLAN	0	.	
NEW ZEALA	0	.	
NORWAY	0	.	
OMAN	0	.	21
POLAND	1	.	47
SAUDI ARAB	0	.	
SEYCHELLE	0	.	50
SINGAPORE	0	.	
SOLOMON IS	0	.	28
SOMALIA	1	.	
SOUTH AFRI	0	.	
SPAIN	0	.	
ST. LUCIA	0	.	8
ST. VINCENT	0	.	15
SURINAME	0	.	
SWEDEN	0	.	
SWITZERLA	0	.	
SYRIAN ARA	0	.	
TONGA	0	.	
UNITED ARA	0	.	
UNITED KING	0	.	
UNITED STA	0	.	
VANUATU	0	.	5
WESTERN S	0	.	23
YEMEN, REP	1	.	
YUGOSLAVI	1	.	
ZAIRE	1	.	
ZAMBIA	1	.	
ZIMBABWE	1	.	42

	RES3	PRES	PVPIB85
NICARAGUA	1	100%	222
MAURITANIA	1	100%	172
JAMAICA	1	100%	167
CHILE	1	100%	122
BOLIVIA	1	100%	71
URUGUAY	1	99%	79
CONGO	1	99%	121
COTE D'IVOII	1	99%	128
MALI	1	98%	66
MADAGASCA	1	98%	64
SENEGAL	1	98%	58
GUYANA	1	97%	217
CENTRAL AF	1	97%	26
UGANDA	1	97%	22
COSTA RICA	1	96%	97
SUDAN	1	95%	43
GHANA	1	94%	21
ECUADOR	1	94%	69
PHILIPPINES	1	93%	77
SIERRA LEOI	1	91%	37
PERU	1	91%	70
TOGO	1	91%	75
GAMBIA, THE	1	90%	66
ARGENTINA	1	90%	60
HONDURAS	1	90%	60
DOMINICAN I	1	89%	60
BENIN	1	89%	35
COLOMBIA	0	88%	43
NIGER	1	87%	52
MOROCCO	1	86%	92
INDONESIA	0	85%	37
BRAZIL	1	82%	44
PARAGUAY	1	78%	48
MALAWI	1	75%	43
EGYPT	1	75%	41
BURUNDI	1	75%	18
EL SALVADO	1	73%	28
TANZANIA	1	73%	45
TURKEY	0	69%	39
GUATEMALA	1	68%	25
BANGLADES	0	67%	15
GABON	1	63%	31
CAMEROON	1	63%	30
BURKINA FA	0	62%	20
KENYA	0	57%	51
SWAZILAND	0	57%	36
NIGERIA	1	53%	23
KOREA, REP	0	49%	49
MAURITIUS	0	44%	49
VENEZUELA	1	42%	51
TUNISIA	0	40%	48
RWANDA	0	39%	12
HAITI	1	32%	14
THAILAND	0	31%	38
FIJI	0	26%	35
PANAMA	1	23%	27
SRI LANKA	0	21%	28
MALAYSIA	0	21%	60
BOTSWANA	0	18%	19
NEPAL	0	17%	10
BARBADOS	0	11%	36
PAKISTAN	0	8%	19
TRINIDAD AN	1	5%	18
INDIA	0	5%	12
PAPUA NEW	0	3%	7
ALGERIA	0	0%	30
PORTUGAL	0	0%	53
MALTA	0	3,46829D-20	15
AFGHANISTA	0	,	
ANGOLA	1	,	
AUSTRALIA	0	,	
AUSTRIA	0	,	